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Summers' annotated bibliographies of secondary reading (1963, 1964), "Review of Educational Research," "Journal of Reading," ERIC/CRIER, and "Research in Education" are listed as resources for all phases of reading. A shifting of trends in the nature and scope of research topics in secondary reading is noted, with diagnosis and treatment, readability, and reading in high school indicated as the most frequently researched areas from 1940 to 1960. The most significant theoretical-empirical study in reading at the secondary level is judged to be "Speed and Power of Reading In High School" by Holmes and Singer, a study based on the substrata-factor theory of reading. This study reveals that more is known about power of reading than about speed of reading and that different criterion groups--i.e. boys and girls--mobilize different sets of subabilities within their separate working systems in order to read for speed. This substrata analysis provides strategies for curriculum development and emphasizes what variables might be taught for various criterion groups. Bibliotherapy, critical reading, and flexibility are listed, among others, as areas of needed research. Charts, tables, and a list of references are included. (RT)

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RESEARCH IN SECONDARY READING

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CHAPTER X

RESEARCH IN SECONDARY READING

by

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The purpose of this article is threefold:

1. To provide a sample of bibliographies, reviews, and resources of secondary reading studies (Grades 7 through 12) which the professional secondary reading educator can turn to in order to keep informed of past, present and future developments.
2. To highlight some recent significant research and implications of this research for secondary reading teachers.
3. To indicate needed research.

Bibliographies, Reviews and Resources

The two most comprehensive annotated bibliographies of secondary reading were written by Summers (1963), (1964). Together these two publications cover the period 1900-1963 and include a total of 1,315 references. According to Summers (1967) research in secondary reading accounts for at least one-fourth to one-fifth of all research done in the entire field of reading. The nature and scope of topics that researchers have concerned themselves with over the past sixty years are given in Table 1.

Several points in Table 1 are of interest:

1. It appears that the entire range of reading behavior has been under investigation at the high school level with many of the categories paralleling similar types of investigations done at the elementary school level.
2. A rank order correlation between categories of research explored before 1940 and from 1940-1960 yielded a correlation of .43. This correlation indicates relatively low agreement between the two periods examined.
3. The 44 percent increase of research in the 1940-1960 period over the previous time period manifests the scientific interest in research and measurement in education.
4. Mass media and reading which ranked thirtieth in the period before 1940 rose to a rank of 11.5 in the 1940-1960 period reflecting the technological advances of the times.
5. Comic books and reading also climbed from a rank of 33 to 16 manifesting society's preoccupation with this type of medium.

A comparison of the Top Five and Lowest Five categories of research before 1940 with the Top Five and Lowest Five categories of research from 1940-1960 is given in Table 2.

Table 1

Summary of Frequency and Rankings of Categories of Research*

Before 1940 and from 1940-1960

Research Category	Before 1940		1940-1960	
	Frequency	Rank	Frequency	Rank
Reading Interests and Habits	48	1.0	37	6.0
Reading and Language Arts	39	2.0	26	9.0
Reading and Study Skills	35	3.0	14	19.0
Recreational, Voluntary and Leisure	30	4.0	9	26.5
Reading and Mathematics	28	5.0	16	11.0
Remedial Reading Programs	23	6.0	21	10.0
Measurement	20	7.0	34	7.0
Achievement in Reading	17	8.0	38	5.0
Reading and History	16	9.5	4	30.5
Reading in Jr. H.S.	16	9.5	24	9.0
Vision and Reading	15	11.0	47	4.0
Reading and Social Studies	11	13.0	13	21.0
Newspaper and Reading	11	13.0	18	13.5
Reading in H.S.	11	13.0	48	2.5
Reading Skills and Teaching Methods	10	15.0	18	13.5
Reading and Science	7	16.5	12	23.0
Reading Comprehension	7	16.5	16	16.0
Reading Materials	6	18.5	19	11.5
Reading and the Content Fields	6	18.5	9	26.5
Intelligence and Reading	5	21.0	12	23.0
Sex Differences and Reading Achievement	5	21.0	6	28.0
Reading Compilations	5	21.0	31	8.0
Mechanical Devices	4	23.5	10	25.0
Diagnosis and Treatment	4	23.5	84	1.0
Reading and Spelling	3	25.5	4	30.5
Professional Training and Reading Teachers	3	25.5	12	23.0
Individual Differences and Reading	2	27.5	5	29.0
Reading and the Gifted	2	27.5	14	19.0
Rate and Comprehension	1	30.0	2	33.0
Reading Achievement, Past and Present	1	30.0	14	19.0
Mass Media and Reading	1	30.0	19	11.5
Readability	0	33.0	48	2.5
Reading and Comic Books	0	33.0	16	16.0
Auditory Abilities and Reading	0	33.0	3	32.0

*Based on data in Summers (1963) (1964).

Table 2

Comparison of Top Five and Lowest Five Categories of Research in Secondary Reading

Before 1940 and from 1940-1960

Top Five, Before 1940	Top Five, 1940-1960
1. Reading Interests and Habits	1. Diagnosis and Treatment
2. Reading and Language Arts	2. Readability
3. Reading and Study Skills	3. Reading in High School
4. Recreational, Voluntary and Leisure	4. Vision and Hearing
5. Reading and Mathematics	5. Achievement in Reading
Lowest Five, Before 1940	**Lowest Five, 1940-1960**
1. Reading Achievement, Past and Present	1. Individual Differences and Reading
2. Mass Media and Reading	2. Reading History
3. Readability	3. Reading and Spelling
4. Reading and Comic Books	4. Auditory Ability and Reading
5. Auditory Ability and Reading	5. Rate and Comprehension

Several trends may be noted from Table 2:

1. Not one of the Top Five research categories which appear before 1940 is in the Top Five from 1940-1960.
2. Readability which was one of the Lowest Five before 1940 appears as the second highest among the Top Five in 1940-1960. Klare (1963) is the definitive integrative work in this area and Bormuth (1966) reflects recent interest of applying linguistics to readibility.
3. A definite shift from normative interest in recreational and content areas before 1940 to diagnosis. remediation, and achievement in the 1940-1960 period is evident. Corrective reading at the high school level by Robinson and Rauch (1966) is representative of this trend at the high school level.

Reviews of reading at the secondary level have appeared in recent years primarily in two publications, *Review of Educational Research* and the *Journal of Reading*. The most recent review in the *Review of Educational Research* appeared in the April 1967 issue by Summers (1967). These reviews appear every three years in the April issue. Since 1960, H. Alan Robinson and his co-workers have annually reviewed secondary reading in the November issue of the *Journal of Reading*. The last issue appearing in the *Journal of Reading* was written by Muskopf and Robinson (1966). The overall impression Muskopf and Robinson (1966) had of high school reading at that time was that "Little of significance was written; essentially the same old theories and old suggestions were rehashed." However, as will be pointed out in the second

part of this article, some significant new ways of looking at old problems have been developed.

Resources in all phases of reading have been greatly enhanced with the establishment of ERIC/CRIER (Educational Research Information Center/ Clearinghouse Retrieval of Information and Evaluation on Reading) at the University of Indiana under the co-directorship of Dr. Leo Fay and Dr. Edward Summers. Some of the materials available will deal with research and project proposals, materials from NDEA institutes, curriculum and teacher guides, program outlines, bibliographies and critical reviews. All these materials, including those collected at the other seventeen ERIC centers, are systematically indexed monthly in a Superintendent of Documents monthly publication (since November 1966) *Research in Education* which is published twelve times per year. The subscription rate is $11 and it can be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Summers' (1963) (1964) comprehensive bibliographies were obtained through the ERIC system.

Highlights of Recent Significant Research

The most significant theoretical and empirical study in reading at the secondary level is Speed and Power of Reading in High School by Holmes and Singer (1966). This study reported in a U.S. Office of Education monograph is based on the Substrata-Factor Theory of Reading developed by Holmes (1960), Singer (1962), and Holmes and Singer (1964). The Substrata-Factor Theory of Reading was further generalized by Kling (1966) to General Open Systems Theory.

Spache (1964) in discussing the Substrata-Factor Theory's design notes that:

> ...the Substrata-Factor Theory hypothesizes that reading is based upon a number of interacting visual, auditory and mental abilities and other components. It is widely accepted as a possible explanation of brain function that there are widespread systems of brain cells containing memory traces of various types of information. Although these subsystems are in different parts of the brain (as the visual and language areas) they may be simultaneously employed in the reading act in a working system according to the needs of the reader. (p. 915).

The major hypothesis of the Holmes and Singer (1966) study is that different criterion groups will utilize different working system hierarchies of subabilities for the purpose of reading with speed and/or power.

From a representative sample of 400 high school students, the major hypothesis, that there is more than one way to skin the reading act, was tested on the following criterion groups:

a. Total Sample, N = 400
b. Boys, N = 211, vs. Girls, N = 189
c. Verbally Bright, N = 108, vs. Verbally Dull, N = 108
d. Fastest Readers, N = 108, vs. Slowest Readers, N = 108
e. Powerful Readers, N = 108, vs. Nonpowerful Readers, N = 108

Some 54 independent variables were assembled into a battery representing ten categories:

1. Mental abilities
2. Linguistic abilities
3. Verbal perception
4. Listening comprehension
5. Elements of musical ability
6. Academic attitudes — habits
7. Interest
8. Emotional — social problems
9. Musicality
10. Age

The criterion tests used to assess Speed of Reading and Power of Reading were:

1. Diagnostic Examination of Silent Reading Abilities: Rate of Comprehension Scale, Part I.
2. Dvorak-Van Wagenen Diagnostic Examination of Silent Reading Abilities, Junior Division, Part III, Form M.

This power test derives 100 questions based on twenty paragraphs which deal with:

1. Ability to grasp central thought of the paragraph
2. Ability to note clearly stated details
3. Ability to interpret context of the paragraph
4. Ability to grasp an idea that is distributed throughout several sentences
5. Ability to draw inferences from ideas in a paragraph

The 54 variables were submitted to a substrata analysis which identifies primary, secondary and tertiary factors as they relate to the major criterion, Speed and/or Power of Reading. Theoretically, if all the relevant variables were known at each level, 100 percent of what makes for individual differences

Table 3
Criterion Group and Percent Variation
Accounted-For in Speed and/or Power of Reading

Criterion Group	N	Percent Speed	Percent Power
Total Sample	400	54.5	74.6
Boys	108	46.5	71.9
Girls	108	56.1	77.9
Verbally Bright Readers	108	20.0	52.8
Verbally Dull Readers	108	37.2	72.9
Fastest Readers	108	22.4	—
Slowest Readers	108	33.7	—
Powerful Readers	108	—	28.2
Nonpowerful Readers	108	—	61.0

in the criterion would be accounted for. The Holmes-Singer study did not sample *all* the relevant variables because many that might be relevant are not very reliable (e.g. personality), or are not very testable at this time (e.g. motivation)!!

The percent of variation accounted for Speed and/or Power of Reading for the various criterion groups is presented in Table 3.

It is apparent from Table 3 that:

1. More is known about Power of Reading than Speed of Reading

BOYS*

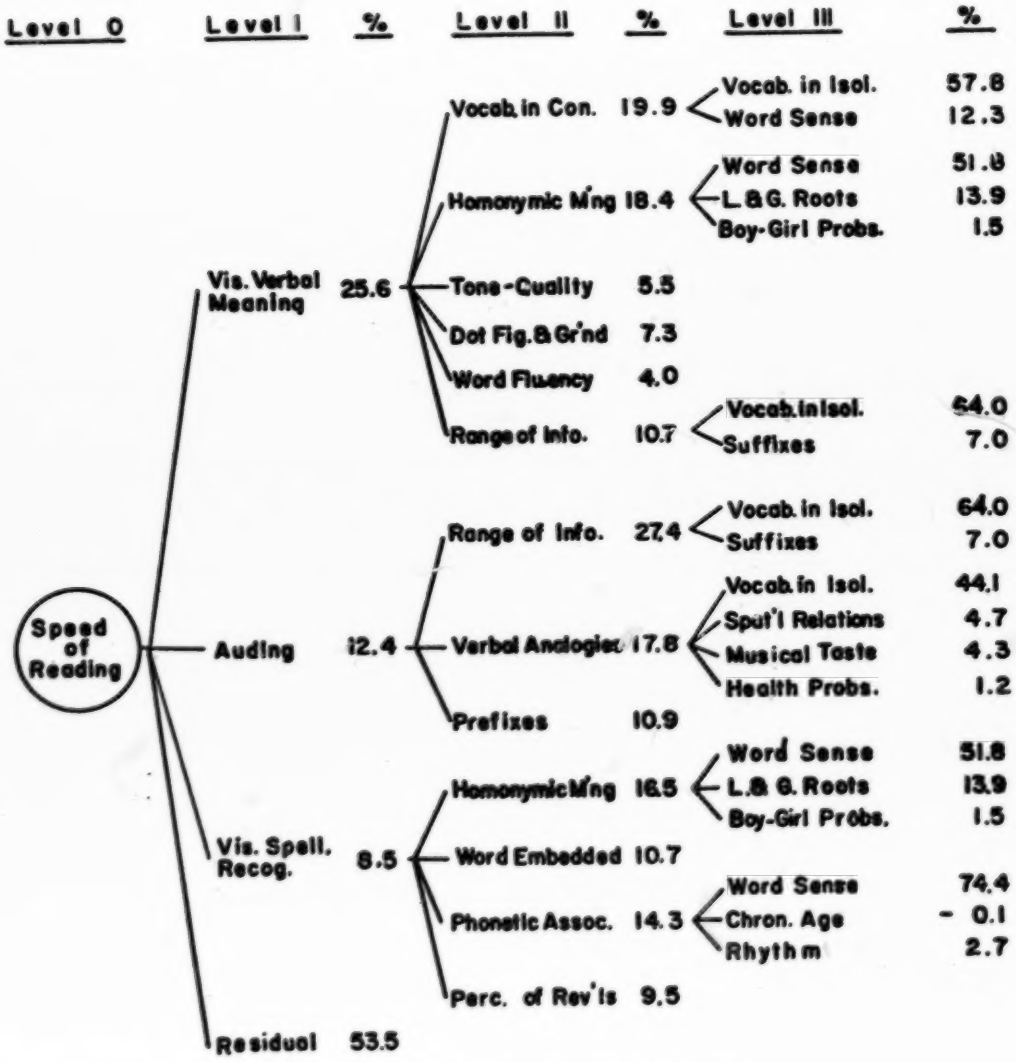

Figure 1. Flowchart for Speed of Reading for 211 high school boys

* From Holmes and Singer (1966), p. 90

2. About an equal amount is known for Speed and/or Power for boys and girls
3. Even less is known about the well functioning readers than their poor functioning counterparts
4. A large amount of variation is yet to be accounted-for Speed (43.9%-80%) and Power (22.1% to 72.8%) in areas ~~most~~ sampled in this study.

Two sample flow charts stemming from these substrata analyses for Speed of Reading for Boys and Girls are given in Figure 1 and Figure 2, respectively.

A detailed comparison of the variables selected by the two substrata analyses for the two sets indicates that the major hypothesis of the study was substantiated; different criterion groups mobilize different sets of subabilities within their separate working systems in order to read for speed.

Table 4 indicates the common and specific variables selected for boys and girls regardless of levels.

Table 4

Common and Specific Substrata Variables Regardless of Levels Selected for Boys (N=211) and Girls (N=189) in Speed of Reading*

Specific Substrata Variable	Level Boys	Level Girls	Common Substrata Variable	Level Boys	Level Girls
Visual Verbal meaning	I	I	Word fluency	II	—
Auding	I	I	Boy-girl problems	III	—
Visual spelling recognition	I	II	School adjustment and morale	—	II
Homonymic meaning	II	I	Inductive reasoning	—	II
Vocabulary in context	II	II	Suffixes	III	—
Dot figure and ground	II	II	Spatial relations	III	—
Range of information	II	II	Musical taste	III	—
Verbal analogies	II	II	Health problems	III	—
Prefixes	II	III	Chronological age	III	—
Word embedded	II	III	Rhythm	III	—
Phonetic association	II	III	Clerical interest	—	III
Perception of reversals	II	III	Artistic interest	—	III
Word sense	III	II	Tonal movement	—	III
Latin and Greek roots	III	II	Mechanical aptitude	—	III
Vocabulary in isolation	III	III	Cue-symbol closure	—	III
Tone-quality	II	—			

*Adapted from Holmes and Singer (1966), p. 88.

Three points are brought out in Table 4:

1. Seven variables are common to, and appear at the same Levels in the working system of Speed for boys and girls.

GIRLS*

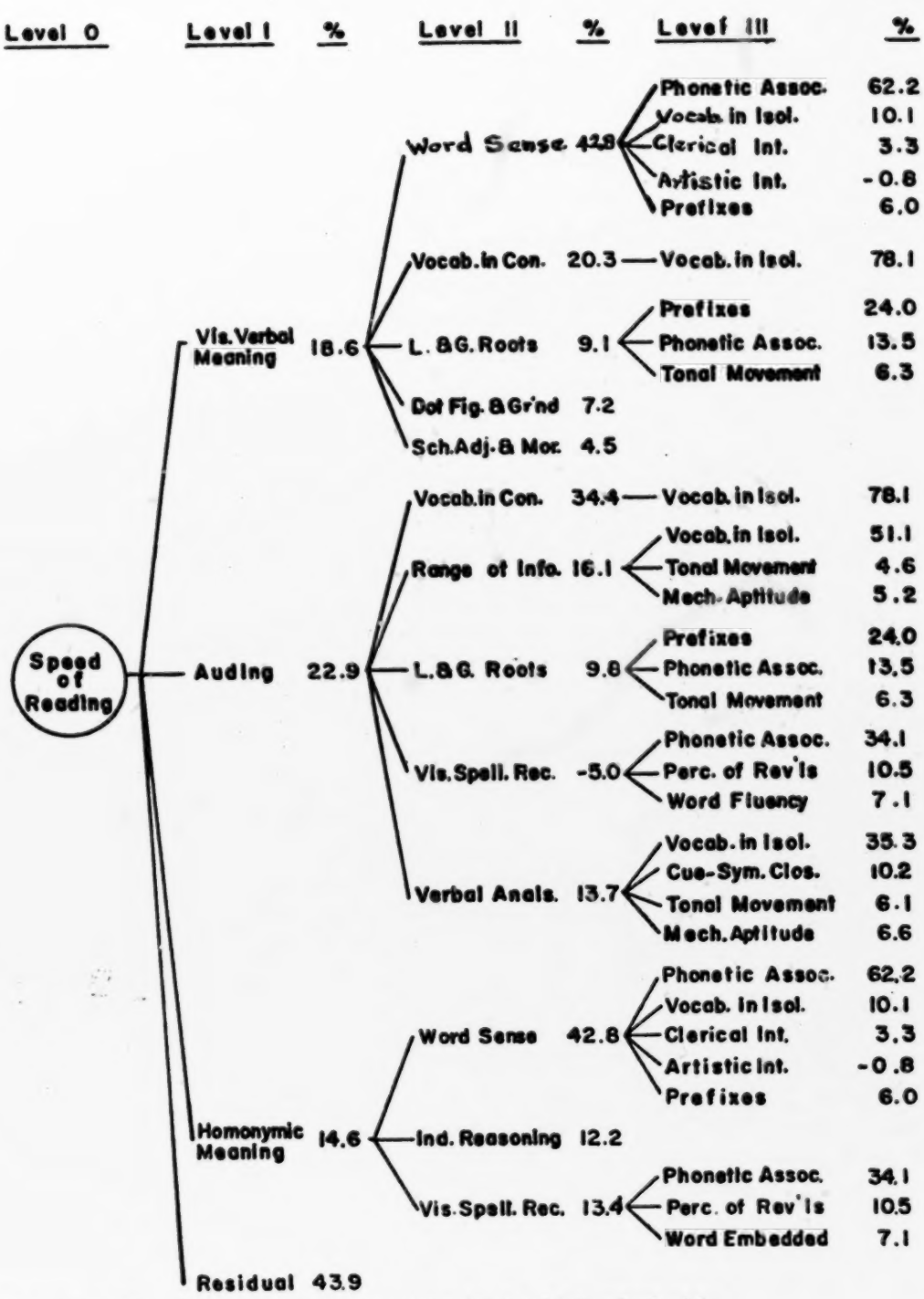

Figure 2. Flowchart for Speed of Reading for 189 high school girls

* From Holmes and Singer (1966), p. 91

2. Eight other variables are common to the hierarchies of both sexes but appear at different levels.
3. Qualitative differences appear for the two substrata analyses which selected nine variables specific to the boys' and seven specific to the girls' working systems for Speed of Reading.

Detailed flow charts and psychographs are developed for the other criterion groups.

Implications for Teaching Reading at the Secondary School Level

The flow charts stemming from the substrata analyses provide strategies for curriculum development and emphasize what variables might be taught for various criterion groups. The order and magnitude of the variables as indicated by the percentages in Figure 1 and 2 at different levels might indicate how much of a particular skill should be emphasized. At present there is no study which has examined or evaluated the impact of such instruction. However, the diagnostic tests for such instructional effort are available in Holmes and Singer (1966).

Theoretical explanations of the way these various factors are organized and reorganized may account for many of the mechanisms that enhance or detract from speed and/ or power of reading achievement.

Needed Research

Research areas that might well contribute to further understanding of reading at all levels as well as the secondary level are in the early stages of development as to their impact on reading. Perhaps, with greater refinement, they might generate a whole new group of studies. Some of these areas deal with:

1. Bibliotherapy
2. Compressed speech
3. Critical reading
4. Flexibility
5. General Open Systems Theory
6. Information Theory
7. Interaction analysis
8. Mediational processes
9. Operant Conditioning
10. Psycholinguistics
11. Psychophysical variables
12. Reading and writing
13. Reading to learn
14. Semantic differential
15. Task analysis
16. Verbal learning

An excellent article by Kingston (1966) indicates how and where to track reading research.

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